

Producing Minced Fish Blocks from Colombian Shrimp Trawler By-Catches: Preliminary Studies

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There is a general consensus that we must improve the way we are using our food supply. Man's present capacity to produce food is rapidly being exceeded by the expanding world population. New sources of food and more efficient utilization of existing sources must be developed. Scientists today are working to increase production from sea and land in order to achieve maximum sustainable yields, thus obtaining the greatest benefit from natural resources. In its own way, Vikingos de Colombia is attempting to make better use of the marine resources of the coastal waters off Colombia.

The harvest of shrimp, by trawling, is probably one of the least efficient uses of a food resource. The by-catch returned to the ocean is five or more times greater than the shrimp that are landed. There are several reasons for this. The hold capacity for the average shrimp trawler is small and, until a few years ago, most used ice as a refrigerant. This limited the amount of fish which could be stored and landed from the fishing trip. The average size of shrimp trawlers is not more than 70-80 ft, and they remain at sea up to 30 days. The density of a shrimp population on the fishing grounds compels the ship to stay at sea long enough to cover the expenses of the trip and to make a profit. Time or space needed for catching and storing shrimp cannot be wasted on unprofitable fish.

Our shrimp trawlers land about 90% of the fish by-catch using three methods:

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and return when loaded.

2. *Refrigerated boats.* These have greater hold capacity than the ice boats and can keep the fish they catch in their freezer holds.
3. *All boats* which have storage problems are required to keep the by-catch from their last 4 days of fishing.

The following list shows the main species of finfish usually caught along with the shrimp and the proportion of abundance of each. We combine these species to create new seafood products.

| FAMILY | | FREQUENCY % |
|---------------|--------------|-------------|
| Lutjanidae | – Snappers | 60% |
| Sciaenidae | – Drums | 18% |
| Pomadasysidae | – Grunts | 10% |
| Sparidae | – Porgies | 8% |
| Mullidae | – Goatfishes | 2% |
| Others | | 2% |
| | | 100% |

When the catch arrives at the plant, it is separated into two general categories: fish that are marketable as fillets or in the round, and those which are going to be deboned to produce the minced product. Marketable fish are frozen and packaged as gilled and gutted fish, or fish fillets.

Minced fish is obtained from two general sources: remains from the filleting operation, or whole headed and gutted fish. Most of the fish are headed and gutted at the plant by hand. (We need a machine capable of automatically heading and gutting the wide size-range of tropical species from our waters.) During this operation, fish are washed to eliminate blood spots which could alter final minced-fish color. Next the fish are washed in chloride water to reduce bacteria to a minimum level. From this tank, fish go through the deboning machine which is self-feeding. Minced flesh recovery is from 70 to 80% of the fish input. From this point, we follow different procedures to establish a definite commercial production line. As a general pattern, the minced flesh is weighed and packed in polyethylene bags in 5- and 10-lb blocks. These blocks are placed in trays, frozen in a plate freezer under pressure, packed in master cartons and stored at 0°F, or lower.

We are now developing a quality control system based on the greater flexibility of processing minced fish.

1. *Sanitary control:* Bacteriological sampling is done at different steps during the process: before mincing, during the packing, after freezing, and monthly after storage.
2. *Stabilization:* Through use of additives.
3. *Control of succulence:* Through moisture control.
4. *Control of texture:* Through particle size, binder, and blending of species.
5. *Bone content:* Determining total percent of calcium content by E.D.T.A. procedure (volumetric test).
6. *Color:* So far, we are not concerned about color because our consumers do not require white minced flesh.
7. *Shelf life:* Through use of additives and continuous rancidity tests we reduce the changes in oxidation.

The potential demand for minced fish is practically unlimited, but it will take a sustained effort to develop the market. We are working closely with the largest frozen meat products company in Colombia which possesses cold storage facilities and marketing experience necessary to start a national distribution experiment. Our product line will most likely include fish sticks, fishburgers, fishcakes, sausages, fillets, and fish balls. Our main task will be to develop a market in our country, but there is a great potential foreign market for minced blocks also.

There certainly are problems to overcome in developing a totally acceptable international minced-fish block. An educational program designed to educate consumers concerning the attributes of minced-fish products is a necessity. However, this is more than a challenge to human capacity, this is part of the race for survival in which all are involved. Let's work together and join efforts against starvation in this world.